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An Explorative Study of the Political, Economic, and Social Factors Influencing the Development of Senior Housing: A Case Study of Hong Kong

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Abstract: Senior housing with age-friendly design and elderly care services contributes to the health and well-being of older people. Previous research has evidenced that the immediate environment factors of senior housing, such as the design of housing features and facilities, have a direct bearing on the satisfaction and quality of life of older people. However, external environment factors, such as political, economic, and social ones that affect key stakeholders' behaviors in senior housing development, are relatively under-researched. Accordingly, this study aimed to explore the external environmental factors influencing the development of senior housing. Taking Hong Kong as case study, this study first commenced with a systematic review to identify the factors in political, economic, and social domains from global evidence. Following this, we interviewed local experts from academia, industry, and government to solicit their opinions on the relative importance of these factors. We then determined the factor rankings using the analytical hierarchy process method. The results showed that local experts perceived economic factors as the most critical ones in influencing senior housing development in Hong Kong, including land costs, funding from financial institutions, and government incentives. If policymakers tend to promote senior housing in densely populated cities like Hong Kong, the policies should be attractive for housing developers, such as land premium concessions and innovative financial channels for supporting the long-term development of senior housing.

Keywords: aging in place; critical factors; densely populated cities; elderly care; housing development; housing for the elderly; pre-COVID; senior housing



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1. Introduction

Population aging has become one of the most critical issues of the twenty-first century. From 2007 to 2017, the number of people aged 65 or over increased from 497 million to 654 million [1], and this number is expected to reach 1.5 billion, which is nearly 16% of the global population, by 2050 [2]. In response to demographic ageing, many cities worldwide have committed to making age-friendly cities [3]. In the process of building these age-friendly cities, the provision of adequate and comfortable housing for senior citizens is essential, because housing not only fulfils a basic human need for shelter, but also contributes to the physical and mental well-being of older people [4].

Senior housing has been widely accepted as an appropriate housing option for maintaining older people's proactivity in their daily lives [5–7]. Senior housing is defined as housing specially designed for seniors, equipped with age-friendly interior and outdoor designs, as well as elderly care services that range from hospitality services to medical care [8,9]. To design suitable senior housing units for older adults, many studies have identified immediate environment factors, such as design features and facilities, that affect older people's satisfaction and preferences [10–13]. Another group of studies has focused

on the immediate environment factors that influence older people's physical activities, social interactions, and lifestyle in their residential life [14–18]. To maximize the benefits of senior housing for older people, promoting the development of senior housing is essential for populations experiencing aging. According to the settlement health model [19], the development of the built environment, including senior housing, could be affected by external environment factors such as government interventions, economic conditions, and cultural attitudes. However, the external environment factors that could influence the development of senior housing are under-researched. To increase the provision of senior housing, it is crucial for decision makers to better understand the external factors they may encounter when developing senior housing initiatives and which ones are critical in real-world practices.

In response to this research gap, the present study aims to identify the external environmental factors essential to the development of senior housing, with Hong Kong serving as the case study. Hong Kong, a densely populated aging Asian city, is facing an aging crisis. However, the current shortage of senior housing provisions cannot satisfy the increasing needs of its senior citizens. A systematic literature review was conducted to gather empirical evidence on the essential factors, covering the political, economic, and social aspects of senior housing. Semi-structured interviews were undertaken with local experts from academia, industry, and government to solicit their opinions on the relative importance of each factor in the context of Hong Kong. An analytical hierarchy process method was utilized to quantify the experts' judgments for determining the relative importance of these factors. The present study hopes to provide evidence-based suggestions for policymakers promoting senior housing practices and to shed light on common experiences for other densely populated aging Asian cities.

2. Literature Review

2.1. The Definition of Senior Housing

As people age, their physical and psychological conditions become fragile. The built-environment settings and service provision of traditional housing have become inadequate in meeting older people's special needs. The immediate living environment for seniors needs to be modified to accommodate their special needs, which calls for the provision of specially designed housing for seniors, i.e., senior housing.

Senior housing consists of two major components: the real estate component and the services component [9]. The real estate component refers to the built environment (the interior and outdoor environment) of senior housing properties that provide shelter for seniors and support their daily life activities and recreation. Unlike ordinary residential properties, the built environment of senior housing properties should have special access and adapted designs to facilitate seniors to complete their activities of daily living (ADLs), such as walking around, eating, and bathing [20]. As such, barrier-free design has been a popular and widely accepted design concept for senior housing, for example, the installation of grab bars in the bathroom, wider doorways, and corridors for seniors in wheelchairs [8].

The services component refers to an array of services provided within senior housing properties to accommodate the physical and psychological needs of seniors. These services include: (1) hospitality services such as meals, transportation, housekeeping, entertainment, and concierge services, (2) assistance with ADL care such as bathing, grooming, dressing, and eating, (3) specialized memory care for seniors with Alzheimer's disease or other forms of dementia, and (4) medical services such as skilled nursing, rehab therapy, and chronic care. As shown in Figure 1, the types of senior housing properties can be categorized by the types and levels of the services they offer (i.e., care segments), and their average monthly rent reflects the level of needs and services mix [9].

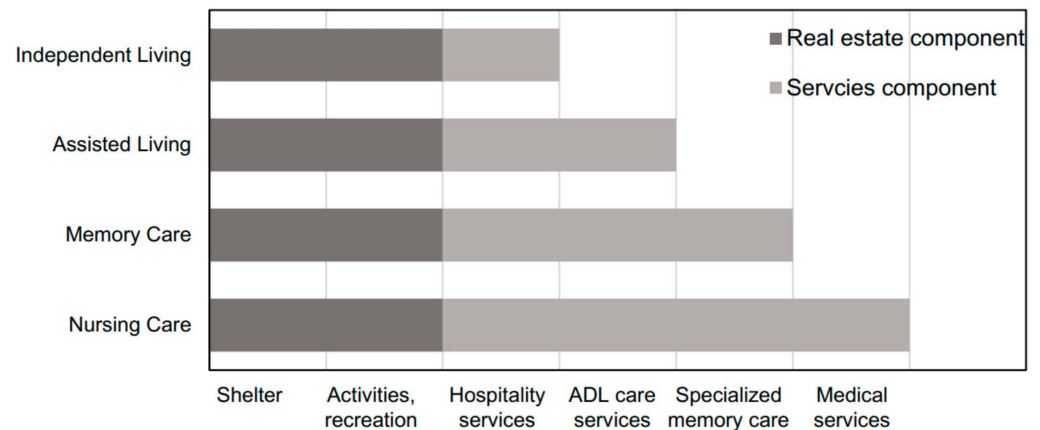


Figure 1. Senior housing property types by care segments (adapted from NIC [9]).

In this study, the term “senior housing” refers to all the types of senior housing properties designed for seniors that include both a real estate component and a services component. However, the following types of housing properties are excluded from this definition: (1) senior apartments, which are age-restricted housing for active adults aged 55 and above but do not offer care services, (2) naturally occurring retirement communities, which have a high proportion of seniors but are not specifically designed to meet their special needs, and (3) general public or affordable housing that lacks the age-friendly built environments and care services that meet the unique needs of seniors, even if they are allocated to seniors on a priority basis.

2.2. Empirical Literature on Senior Housing

To review the existing literature on senior housing, we adapted a classic conceptual framework used in urban planning—the settlement health model—to create a senior housing ecosystem model, as indicated in Figure 2. Drawing on Lynch [21] urban ecosystem theory and Hancock [22] determinants of health theory, the settlement health model posits that the built environment can impact people’s health and well-being through different layers of components, including activities, local economy, community, and lifestyle [19]. As housing is a specific form of the built environment, the settlement health model is suitable to be adapted to review the existing literature on senior housing.

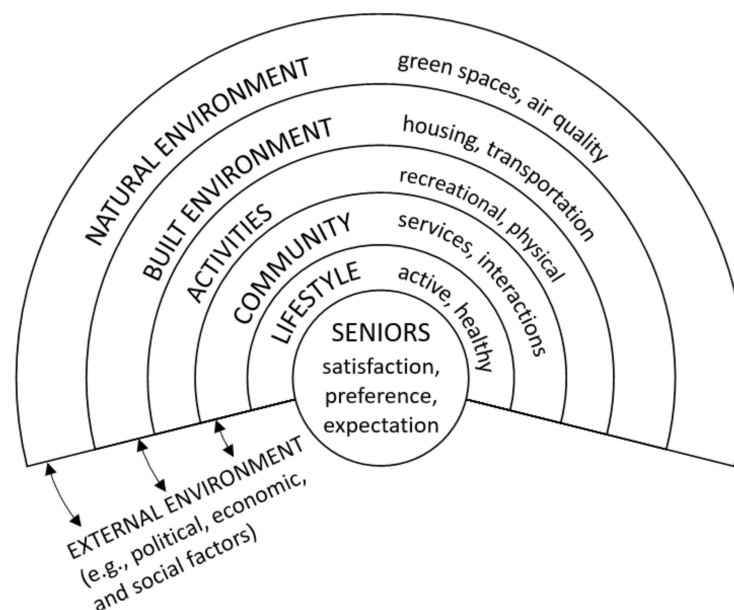


Figure 2. Senior housing ecosystem (adapted from Barton and Grant [19]).

Since older people are the central concern in senior housing development, it is essential to understand their housing satisfaction, preferences, and expectations to design a senior housing system suitable for them [23,24]. A collection of studies investigated the factors concerning housing that affect older people's satisfaction, preferences, and expectations. Phillips, Siu [12] 518 face-to-face interviews discovered that physical environment factors (e.g., interior and exterior dwelling characteristics) were strongly related to older people's residential satisfaction, but formal care factors (e.g., social services and community facilities) and informal care factors (e.g., support from family, friends, and neighbors) were not. Chiu and Ho [10] 3097 telephone interviews revealed that older people had strong preferences for cheap public rental housing and housing with universal design. After conducting face-to-face interviews with 256 seniors, Hui, Wong [11] study found that older people with longer living periods had a higher satisfaction with their current housing conditions. A more recent study by Sun, Phillips [13] discovered that older people living in public housing expressed a greater appreciation for their exterior environment settings (e.g., outdoor spaces, community services, and transportation) than those living in private housing.

The layers of activities, lifestyle, community, and built environments in Figure 2 demonstrate that senior housing can influence older people's activities, lifestyle, and social interactions (in the community), consequently affecting their health and well-being. Therefore, apart from understanding older people's housing satisfaction and preferences, a large body of the literature attempted to investigate the factors concerning senior housing that can positively affect older people's physical activities, living lifestyle, and social interactions, serving as theoretical evidence to support the design of senior housing in practice. Specifically, barrier-free design for housing (e.g., wide doors, sufficient space for wheelchairs, and knee spaces under the sink) and its surrounding environment (e.g., handrails, slopes, and wide hallways) can create a more accessible environment for older people's physical activities, especially for people with disabilities [14,25]. Indoor public amenities (e.g., clubs and leisure/sports centers) and outdoor public spaces (e.g., green spaces and pedestrian ways) can encourage older people to engage in more recreational activities and physical exercise, contributing to a healthy lifestyle and high quality of life [15,17,26,27]. The use of connecting corridors, elevators, and a shared area (e.g., a hall and meeting room) can support the gathering of and communication among senior residents and reinforce their social interactions within the community [16,18,28,29]. All of these studies emphasize the importance of integrating age-friendly features and facilities into housing design to maintain a certain level of proactivity in aging dwellers' daily life routines.

From the above, we can discover that much research has been conducted regarding various immediate environmental factors (i.e., housing and its close surroundings) in relation to senior housing, covering the ones affecting older people's satisfaction and preferences and the ones affecting their activities, social interactions, and lifestyle in their residential life. However, the factors of the external environment in relation to senior housing are under-researched. As shown in Figure 2, the senior housing ecosystem is not a free-standing island that can be affected by various external factors. The factors derived from the external environment include economic factors, legal and political contexts, and broader social trends and cultural attitudes [30]. These external factors can influence the decisions of key stakeholders (e.g., housing developers and older people) in the development of senior housing.

3. Methods

We propose three stages of methods to identify the essential factors of the external environment that influence the development of senior housing. Firstly, we conducted a systematic literature review to explore the essential external environment factors. Secondly, we selected Hong Kong as our study area, a densely populated aging Asian city with unique experiences in senior housing practices. We conducted face-to-face interviews with local experts in the senior housing field to gather their opinions and empirical evidence on

the reviewed factors, in order to make them more practical within a specific context. Finally, we applied the analytical hierarchy process method to quantify the relative importance of each factor, with the aim of identifying the most critical ones in the context of Hong Kong.

3.1. Systematic Literature Review

3.1.1. Searching Process

A systematic literature review was conducted to collect empirical evidence on the factors of the external environment that influence senior housing development. As shown in Table 1, we searched Scopus and the Web of Science for peer-reviewed literature in English, without restricting the start date, in order to identify all the possible evidence before the interviews. Using the same search terms, we also searched Google to select the grey literature that appeared on the first 50 pages, aiming to capture the most relevant hits that were still feasible to screen [31]. The target grey literature included: (1) government reports from the websites of the government offices in charge of housing and urban planning issues (e.g., Hong Kong Housing Authority), and (2) white papers and industry reports from non-government organizations (e.g., the National Investment Center for Seniors Housing & Care) and consulting companies (e.g., Deloitte). Chinese language studies were also included if their abstracts had an English version (e.g., the study by Peng, Zhang [32]).

Table 1. Searching strategies for peer-reviewed literature.

Search Terms in Title/Abstract	Restrictions	Hits from Database
Senior housing “senior housing” OR “seniors’ housing” OR “elderly housing” OR “housing for the elderly” OR “housing for the seniors” OR “housing for senior citizens” OR “housing for older people” OR “housing for older adults”	Language: English Type of publication: peer-reviewed	Scopus: 361 Web of Science: 85 Total: 446
Development “development” OR “investment” OR “provision”		

3.1.2. Selection and Appraisal of Documents

A total of two authors screened the titles and abstracts and read through the full texts. The studies were included only if their contents were relevant to our research question. Studies were excluded if the senior housing mentioned did not fall within the present study’s definition and research scope. An agreement was reached through discussion, and 11 studies were selected. Additionally, we identified 21 more studies by reviewing the reference lists of the selected studies and via the search for grey literature using Google search. This led to a final list of 51 studies, as shown in Figure 3.

3.1.3. Data Extraction

We extracted and categorized the factors using the PEST model, which includes four categories: political, economic, social-cultural, and technological factors. The PEST model is a widely used conceptual framework in the strategic management field to identify the external macro-environment factors that influence the decision making of projects, companies, or industries [33–35]. Since the senior housing industry is not technology-driven and does not require the adoption of advanced technologies, we excluded the technological domain in our study and focused on the first three categories: political, economic, and social factors.

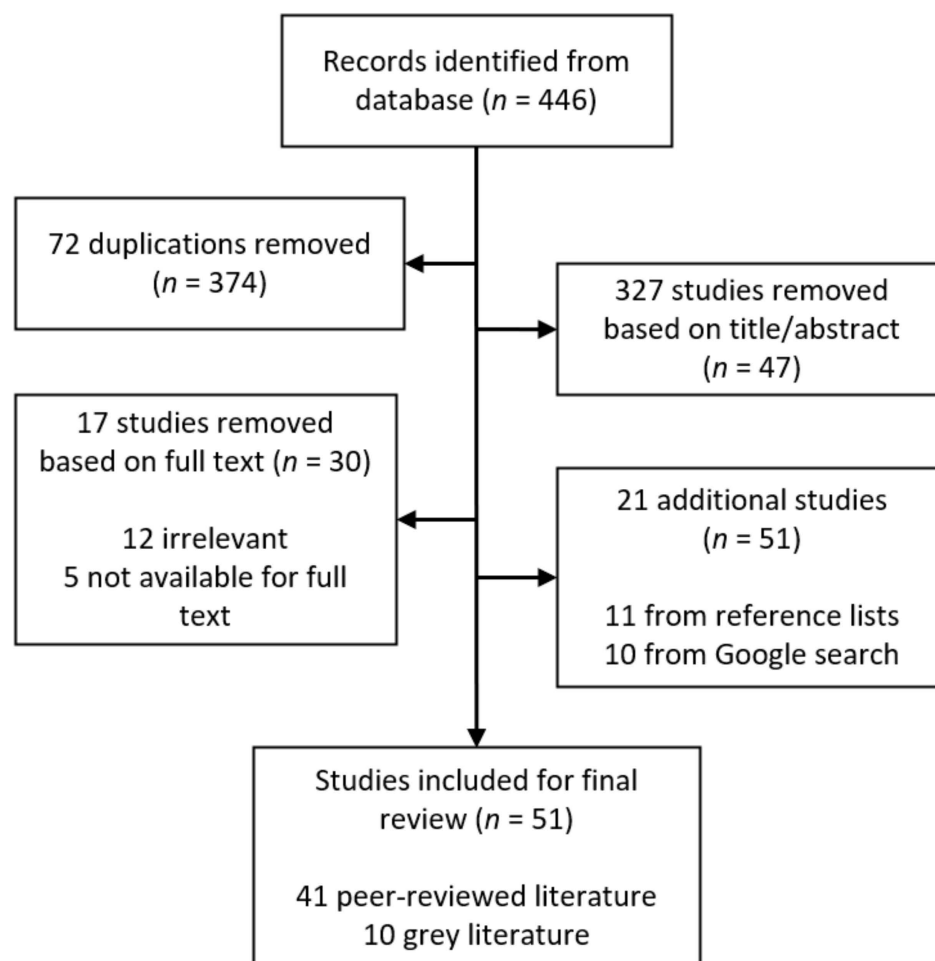


Figure 3. Flowchart of paper selection.

According to the PEST model, political factors guide, regulate, motivate, and coordinate the development of the senior housing industry, while economic factors influence the profitability of senior housing properties, which is highly related to the level of involvement that housing developers have in the senior housing market. Social factors, on the other hand, influence the direct users of these senior housing properties, and impact older people’s willingness, abilities, and preferences for living in senior housing units. From this definition, we can see that political and economic factors are relevant to the supply side of the senior housing market, which affects the willingness of housing developers to supply senior housing units in the market. In contrast, social factors are relevant to the demand side, which influences the senior housing demands of older persons. This supply–demand perspective can also help us to better understand how the different domains of the external factors impact the two major roles in the senior housing market, i.e., housing developers and seniors.

3.1.4. Data Synthesis

Under the guidance of the PEST framework, we narratively synthesized the literature and categorized the factors in the political, economic, and social domains with necessary explanations and examples. The contents were synthesized as one factor only if this content had been mentioned in more than two studies as “challenges”, “barriers”, “difficulties”, or “essential/important factors” in the development of senior housing.

3.2. Face-to-Face Interviews with Local Experts

3.2.1. Empirical Background

Hong Kong, located in East Asia, is among the most densely populated cities in the world and one of the most economically developed, with a population of 7.39 million and a gross domestic product per capita of USD 46,165 in 2017 [36]. However, the city faces the challenge of population aging, with its number of older persons reaching 1.22 million in 2017, almost one sixth of the total population, and this number is projected to reach 34 percent of the total population by 2066 [37]. This demographic trend has created significant challenges for Hong Kong's society, particularly in the provision of suitable housing for senior citizens [38].

There are two senior housing providers in Hong Kong. The first is the Hong Kong Housing Society (HKHS), a not-for-profit housing organization that aims to provide quality housing for local citizens [39]. In the early 1970s, HKHS began to provide low-rental-fee elderly flats for senior singles and couples in Lok Man Sun Chuen [40]. Since then, HKHS has gradually arranged for the construction of around 900 elderly flats in newly-built or retrofitted housing estates under the Elderly Persons' Flats Scheme [41]. In 2003, HKHS launched the Senior Citizen Residences Scheme for middle-income seniors, under which two housing estates with 576 units were built, providing medical and recreational amenities such as a clinic, gymnasium, and multi-purpose hall [42]. In 2015, recognizing the needs of high-income seniors, HKHS completed one non-subsidized senior housing project with all-around recreational amenities and a continuum of professional nursing and medical-care services, all in one place [43]. The second senior housing provider is the Hong Kong Housing Authority (HKHA), a government agency that implements a public housing program to provide affordable rental housing for low-income citizens [44]. In the late 1980s, the HKHA launched the Housing for Senior Citizens (HSC) Scheme, under which low-income senior singles could apply for public rental housing equipped with communal facilities and a 24 h warden service [45]. Hostel-type HSC units were gradually replaced by self-contained flats equipped with age-friendly design features, such as non-slippery floor tiles and single lever taps [46]. The HKHA currently offers senior housing priority schemes, under which eligible older applicants can enjoy the prioritized allocation of public rental housing and nearly of half the waiting time compared to common applicants [47].

Despite the efforts made by the HKHS and HKHA, the development of senior housing in Hong Kong still faces great challenges. First, the current provision of senior housing units cannot meet the overwhelming housing needs of Hong Kong seniors. Most senior housing units provided by the HKHS have been rented out, with only a few high-priced and long-lease units still available [48]. Seniors who apply for public rental housing units must wait at least 2.9 years to receive housing offers [49]. Moreover, many seniors still live in old urban communities (e.g., Kowloon City and Sham Shui Po) with extremely poor and unsafe housing conditions, and without any basic services and facilities [11]. Such a shortage of senior-housing provisions is expected to become more severe due to the inevitable trend of population aging. Second, despite the unmet senior housing needs, private housing developers have not yet entered the senior housing market in Hong Kong [38,50]. For this reason, unlike in other countries such as the U.S. and Singapore, where both the public and private sectors actively respond to the housing needs of the elderly, no senior housing units are available in the private property market in Hong Kong. Therefore, this study of Hong Kong has strong practical implications. The conflict between the aging population and the shortage of senior housing provision calls for the need to investigate what external factors are affecting the development of senior housing in Hong Kong, and what strategies policymakers can adopt in response to the most critical factors. This study of Hong Kong is also timely, and its experience will probably shed light on common experiences for other densely populated aging Asian cities.

3.2.2. Expert Panel

As shown in Table 2, face-to-face interviews were conducted with nine local experts from diverse backgrounds and positions in Hong Kong. As Hong Kong is still in the early stages of its senior housing development, there are a limited number of local experts in the senior housing field available as interviewees. In total, nine local experts were approached from a local conference called the “HKIS Annual Conference 2017–Golden Opportunities in the Aging Community and Built Environment”. Specifically, three academics’ research interests covered the areas of housing for the elderly and the active aging within urban planning and development. Among the four practitioners, two had rich working experience in public senior housing development in Hong Kong, while the other two were leading private housing providers whose opinions were sought in terms of the most important factors to consider when planning to enter Hong Kong’s senior housing market. Of the two government officials, one representative was from the Hong Kong Housing Authority, one of the two largest senior housing providers in Hong Kong, and the other was from the Urban Renewal Authority, which promotes inclusionary zoning and universal design concepts within the context of the urban transformation process, in order to support Hong Kong citizens’ active aging. Most of the experts held senior positions with over 20 years of working experience and were considered to be leading experts in their respective fields.

Table 2. The profile of the local experts.

Type	Position and Background	Years of Experience
Academics	Professor (expertise: housing for the elderly, population aging and mobility, and housing and land prices)	Over 20 years
	Professor (expertise: urban planning and development, active aging, and urban environment)	Over 20 years
	Assistant professor (expertise: urban studies, aging and wellbeing, and governance and the state)	10–15 years
Practitioners	Director of a local real estate development company (private housing developer)	Over 20 years
	Chairman of local property and real estate development service company (private housing developer)	Over 20 years
	Representative of Hong Kong Housing Society (the largest not-for-profit housing organization and senior housing provider)	Over 20 years
	Panel member of housing policy group in the Hong Kong Institute of Surveyors (A local surveying organization that plays an important consultative role in the government’s policymaking on senior housing)	Over 20 years
Government officials	Representative of the Hong Kong Housing Authority (the public housing authority and senior housing provider)	Over 20 years
	Representative of the Urban Renewal Authority (the statutory body that has promoted inclusive and age-friendly land use development in recent years)	1–5 years

Before conducting the formal face-to-face interviews with local experts, we pretested the instrument through an expert review of the draft questionnaire. In total, one academic, one practitioner, and one government official were asked to read through the draft questionnaire to identify any measurement errors, including ambiguous questions, word meanings, and question difficulty [51,52]. Based on the pretesting results, we refined the questionnaire and conducted the formal interviews at the experts’ workplace between November 2017 to January 2018, prior to the COVID-19 pandemic. We used semi-structured interviews with both open-ended and close-ended questions. The open-ended questions were used to examine the face validity of the reviewed factors in terms of their appearance and relevance from a commonsensical perspective [53]. All the experts agreed that the reviewed

factors made sense in practice and closely fit the context of Hong Kong, indicating their face validity. The close-ended questions were used to collect the experts' judgment on the relative importance of each factor using questionnaires, which served as the raw data for further empirical analysis.

3.3. Analytical Hierarchy Process

The analytical hierarchy process (AHP) is a multi-criteria decision making technique developed by Saaty [54] to compare alternative factors based on their received weights from the experts' judgments. AHP is popular for prioritizing a set of factors in many fields, including business planning, resource allocation prioritization, and the selection of key performance indicators [55]. In this study, the AHP method is used to determine the relative importance of each factor within the context of Hong Kong, based on the weights and rankings of each of the factors analyzed. There are two reasons for adopting the AHP method in this study: First, through the set of calculation steps used in AHP, the qualitative professional judgements of decision makers can be easily converted into quantitative outcomes [56]. This allows us to assign the relative importance of each factor based on the qualitative judgements of the experts. Second, it is acceptable to use a small sample of experts in the AHP method, if solid and professional knowledge can be derived from these reliable experts [57,58]. Many researchers have adopted a sample of fewer than 10 experts in an AHP survey of their studies [59–62]. This feature is essential for this study due to the limited number of local experts in the field of senior housing that were available as interviewees in Hong Kong. The AHP method involves four major steps, including a hierarchy construction, pairwise comparison, weight calculation, and consistency test, which are demonstrated in Appendix A.

4. Results

4.1. External Factors Influencing Senior Housing Development

From the systematic literature review, we have summarized nine external environmental factors that influence the development of senior housing in the political, economic, and social domains, as shown in Table 3. All factors have been supported by at least three reviewed studies, and six out of the nine factors have been mentioned by nine or more studies.

Table 3. Political, economic, and social factors influencing the development of senior housing.

Category	Factors	Sources
Political	P1. Official regulations and guidelines for the design and operation of senior housing properties	[63–74]
	P2. Government supportive policies and incentives for senior housing properties	[7,32,66,69,70,75–84]
	P3. A specific government agency for administering affairs in relation to senior citizens	[7,85–87]
Economic	E1. Land costs	[38,68,88–90]
	E2. Funding from financial institutions	[9,38,66,68,69,71,91–97]
	E3. The availability of elderly care practitioners	[9,66,69,70,74,78,91,92,98–104]
Social	S1. Older people's willingness to move into senior housing properties	[7,66,68,77,92,105–108]
	S2. Senior housing affordability for older people	[9,66,77,82,89,92,102,109–113]
	S3. Existing alternative elderly care services options for older people	[9,66,114]

4.1.1. Political Factors

P1. Official regulations and guidelines for the design and operation of senior housing properties. Official regulations and guidelines can help the government to oversee the senior housing market, and, at the same time, allow providers to work proactively with regulators to meet the housing and service needs of senior residents [72]. In the US, senior housing properties are highly regulated by federal, state, and local laws and regulations that outline the minimal requirements for senior housing properties, in terms of their built environment design and service provisions [67]. For example, senior housing properties are required to obtain licensed operation certificates for providing qualified elderly care services. Furthermore, some local authorities in the US also provide standards and guidelines that outline the best practice for senior housing properties, serving as essential design and operation manuals for housing developers, service operators, government staff, and local communities [63,65]. In mainland China, although the state government has published a set of nationwide guidelines for fostering the development of senior housing, such general regulatory guidelines, without detailed and substantive rules, these guidelines are hard to implement locally [71]. Some studies have mentioned that senior housing development in China is suffering from its lack of detailed and specific regulations and guidelines, resulting in a disparate quality of the senior housing products available in the market [66,68,69].

P2. Government supportive policies and incentives for senior housing properties. Government supportive policies and incentives can motivate housing developers to participate in senior housing properties, and thereby expedite the development of the senior housing industry [69,77]. These supportive policies and incentives include the expedited approval for senior housing projects, land supply preferential policies, tax exemptions, and subsidies [32,66,75]. In China, the boost of the senior housing market is largely due to a series of supportive policies that have been published by the state government over the last decade, such as the “Opinions on Encouraging and Guiding Private Capital to Invest in Elderly Service Industry” released by the Ministry of Civil Affairs in 2012 [76]. In Singapore, the Urban Redevelopment Authority provided the senior housing project, the Hillford, with an additional 10% of the maximum permissible gross floor area to support the installation of medical and communal facilities for senior residents [7].

P3. A specific government agency for administering affairs in relation to senior citizens. Having a government agency dedicated to senior citizen affairs can help to coordinate the resources and capabilities of local government institutions (such as the departments of housing, social welfare, and health and medical care) to support the development of the senior housing industry [85,87]. In Canada, some cities, such as Vancouver, have established Senior Housing Authorities to oversee whether senior housing development proposals meet the age-friendly requirements listed in the “For Seniors Guidelines” [86]. In Singapore, the Committee on the Problems of the Aged (now called the Ministerial Committee on Aging) has been set up since 1982 to administer the housing and healthcare affairs of local seniors [7]. In Hong Kong, since there is no such special government agency, the Hong Kong Institute of Surveyors’ press release on “Suggestions on the Elderly Housing Policy” recommends that the Hong Kong government establish an “Elderly Affairs Committee” in the short term to commence policy work for seniors using administrative measures, and eventually establish an “Elderly Affairs Bureau” to deal with elderly affairs in the long run [87].

4.1.2. Economic Factors

E1. Land costs. Land costs generally occupy the largest portion of the development costs for senior housing properties. In this case, housing developers are reluctant to develop senior housing properties if they cannot obtain a reduced land acquisition cost [68]. A Singapore government report published by the Committee on Aging Issues mentioned that “developers have often cited the high land cost as the key obstacle to the development of private retirement housing in Singapore” [88] (p. 19). The Hong Kong Planning Department also published an official report, “An Inclusive and Supportive City For All

Ages”, in 2016, which stated that land premium—the fee paid by the developers to the government for obtaining the land-use rights—could be one of the major concerns for the developers inactive in providing housing for older people [38]. A recent study by Lam and Yan [115] also found that high land costs are one of the major investment barriers that hinder the supply of senior housing development in Shanghai and other Tier 1 and 2 major Chinese cities.

E2. Funding from financial institutions. Senior housing properties require significant initial investments due to the high expenses of both the real estate and service components [38], as well as the need for a long payback period from the ex post operation revenues [68]. This weak capital liquidity makes senior housing properties dependent on continuous external funding to sustain their long-term operations [66,94]. However, high initial investments and long payback periods make it challenging to attract capital from traditional financial institutions [92], including debt capital from mortgage loan companies and commercial banks, and equity capital from high net-worth individuals and pension funds [9]. Consequently, innovative financial channels such as Real Estate Investment Trusts (REITs) are commonly required to fund senior housing projects. In the US, publicly traded REITs owned approximately 20.8% (41.7 billion US dollars) of the senior housing properties market in 2017 [9]. Many studies have indicated that insufficient funding from financial institutions and the lack of innovative financial channels limit the growth of the senior housing industry in China [66,68,69,71,92]. Recent studies in Canada and Finland have also identified funding limitations and an inflexible funding system as significant barriers to the development of Seniors’ Campus Continuums and retirement villages, respectively [116,117].

E3. The availability of elderly care practitioners. The provision of elderly care services within senior housing properties requires the employment of well-trained elderly care practitioners, including daily care assistants, nurses, memory care workers, healthcare workers, and social workers, depending on the levels and types of services provided [98,99]. The shortage of elderly care practitioners in the labor market and their resulting high employment costs are common challenges for the development of senior housing [100]. In the US, the shortage of elderly care practitioners makes labor costs the largest expense of operating a senior housing property [9,100]. A similar situation has also occurred in China, Korea, and Canada, where the shortage of professional elderly care practitioners makes it difficult for senior housing properties to provide steady and high-quality services for their senior residents [66,70,92,116].

4.1.3. Social Factors

S1. Older people’s willingness to move into senior housing properties. The willingness of older people to move into senior housing properties is one of the most critical demand-side factors that influences senior housing development, which is largely affected by older people’s mindsets on senior housing within specific social and cultural contexts [107]. In the US, older people are more willing to live alone or with their spouses in senior housing properties because they place much value on independent family relationships [108]. However, in most Asian regions, such as China, Japan, and Singapore, older people tend to stay with family members and age in place due to the traditional culture of “Confucian doctrine” and “filial piety” [7,68,105,106]. Chou [106] conducted a nation-wide survey of 20,255 older Chinese adults and found that only 20% and 17% of Chinese older adults in urban and rural areas were willing to live in long-term care institutions, and such a willingness could be influenced by multiple sociocultural factors, such as perceived filial piety and family harmony. Some industry reports also mentioned that in China, the majority of older people in Chinese urban areas prefer to pass down their heritage (their savings and self-owned houses) to their offspring rather than rent senior housing units, which restricts the development of the senior housing industry in China [66,77,92].

S2. Senior housing affordability for older people. Affordability is a crucial factor in determining the feasibility of senior housing options for older adults [118]. The affordability

gap between the average income of seniors and the expenses of living in senior housing units can impact their decision to move into such properties. In the US, the high monthly payments for senior housing units limit older people's actual demand for such housing [9]. Senior housing affordability is a greater issue in mainland China, where most senior housing properties are high-end projects with costly rental and membership fees, far exceeding the consumption ability of most Chinese seniors, particularly those who do not have social insurance coverage [66,77,92].

S3. Existing alternative elderly care services options for older people. Alternative elderly care service options, especially home- and community-based services (HCBS), are significant competitors for the elderly care services provided by senior housing properties [9,66]. HCBS refers to in-home or community-based elderly care services offered by for-profit businesses or non-profit organizations, targeting seniors who prefer to live in their existing homes and age in place. If seniors have the option to live at home and receive HCBS within their communities, they may choose not to move into a senior housing property. In this case, within regions with a high prevalence of HCBS provision, housing providers may perceive a low level of senior housing demand in this area, reducing their intentions to develop senior housing. In Hong Kong, the Social Welfare Department is responsible for providing community support services and care services for seniors based on different types of community centers (e.g., district elderly community centers and day-care centers), at the district and neighborhood levels [114]. Hong Kong's relatively mature development of the HCBS system may be one of the factors impeding local senior housing development.

4.2. Relative Importance of External Factors in Hong Kong

Figure 4 shows the relative importance of the nine factors based on their global weights, which were calculated from an AHP analysis of the local experts' opinions. The results indicate that the local experts perceived economic factors to be the most significant ones that influence the development of senior housing in Hong Kong. The top four important factors are all related to the profitability of senior housing projects. Specifically, land costs, funding from financial institutions, and supportive policies and incentives are the supply-side factors that influence the costs and benefits of senior housing properties, while senior housing affordability is a demand-side factor that influences the occupancy rates of senior housing properties. The ranking results could be explained by several reasons, as discussed below.

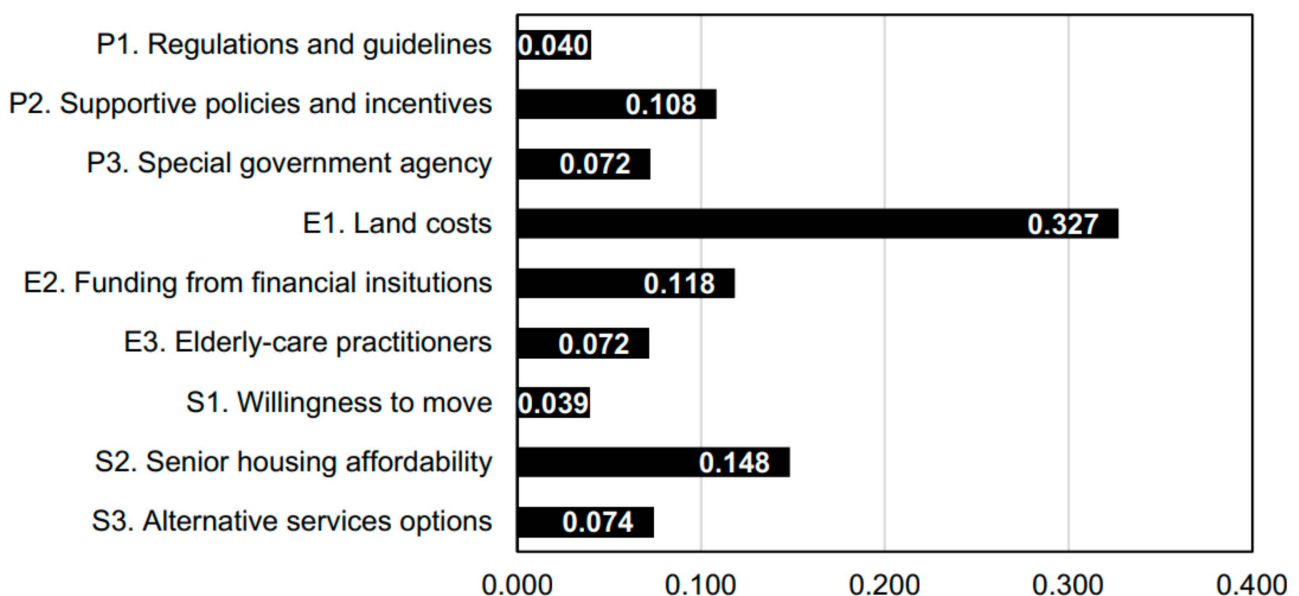


Figure 4. The global weights of the factors affecting senior housing development.

Land costs are the most critical factor, which can be explained by the fact that Hong Kong is the most densely populated city in the world, with an insufficient land supply. An extremely high land premium for non-subsidized housing development projects is commonly required. Land shortage has been a perennial issue in Hong Kong, where the built-up area occupies only 25% of the total land area [119]. The insufficient land supply resulting from this land shortage means that housing developers need to pay a large amount of land premium to obtain the land-use rights for residential development from the government [120]. As land premium occupies over 50% of the total development cost of commercial residential properties, housing developers tend to sell residential units for a fast capital return. However, the profit of senior housing properties mainly comes from the operational revenue due to the senior housing's for-lease and service provision features. As such, a long payback period for senior housing units is often required, which would increase the financial burden of housing developers [68]. Considering the extremely high land costs, housing developers would hope that the local government would provide subsidies in terms of the land acquisition cost to decrease the initial development cost of senior housing properties.

However, there is a general lack of supportive government policies and incentives for the development of senior housing in Hong Kong. Land-use incentives could be the most crucial factor affecting the motivation of housing developers to enter Hong Kong's senior housing market. In Hong Kong, the land premium for senior housing projects is treated no differently than that for commercial or residential properties. To date, only the SEN projects launched by the HKHS (a not-for-profit housing organization) in 1999 received the nominal land premium, allowing senior tenants to live in SEN properties with relatively low rental costs. However, the Joyous Living Scheme, another senior housing scheme launched by the HKHS, failed to obtain land-premium subsidies after negotiations with the local government, resulting in a very long payback period of about 50 years [121]. Seeing such a case, local housing developers would be reluctant to develop senior housing properties in Hong Kong without a land premium concession from the government.

Another important way to reduce the financial burden for senior housing properties is to obtain funding from financial institutions, especially from innovative financial channels such as REITs. The Hong Kong REIT (H-REIT) market is substantially lagging behind the other three REIT markets in Asia (i.e., Singapore-, Malaysia-, and Japan-REITs) [122], with only 11 H-REIT companies in the market that involve a low diversity of asset types [123]. Currently, H-REIT companies have only focused on the investments of retail, mixed, office, and hospitality properties, but without the involvement of healthcare properties, let alone senior housing properties. In this case, developers would face a high uncertainty about whether they can attract funding from the existing H-REIT companies to support the development of senior housing properties.

A low senior housing affordability for older people is another critical factor preventing housing developers from entering Hong Kong's senior housing market. According to the Demographia [124] housing affordability index, Hong Kong is the most unaffordable city for housing in the world, with a ratio of 20.9 compared to the baseline level of 3.0, which is affordable. Meanwhile, the income level of older people in Hong Kong is much lower, with a median monthly income of HKD 6020 in 2016 [125], far below the average short-lease rental fee of HKD 30,000 for a non-subsidized senior housing unit [126]. Even worse, the poverty rate of elderly persons in Hong Kong was over 30% in 2016 [127], compared to 9.2% in the US [128] and 26% in Japan [129]. Considering the low housing affordability for local seniors, the HKIS's press release suggested that the rental fee of senior housing units should be set at about 50% or less of the average private housing price, to make them more affordable and attractive for local seniors [87]. However, such a suggestion is impossible for housing developers without government subsidies (e.g., a land premium concession or waiver) and funding from financial institutions to sustain the long-term operation of senior housing properties.

5. Discussion

The present study explored the external environmental factors that influence the development of senior housing and identified the critical factors within the context of Hong Kong. A systematic literature review was conducted, uncovering and synthesizing nine factors in the political, economic, and social domains from global evidence. These factors, along with detailed explanations and examples, help to bridge the existing knowledge gaps on the political factors that could guide, regulate, motivate, and coordinate senior housing development, the economic factors that could motivate or restrict investments in senior housing properties, and the social factors that could shape older people's living arrangements and their effective demands for senior housing units. Policymakers who plan to intervene in the development of senior housing for their local communities should take these factors into account.

An empirical analysis of local experts' opinions reveals that the lack of housing developers' participation in Hong Kong's senior housing market is mainly caused by four critical factors, including (1) land costs, (2) senior housing affordability for older people, (3) funding from financial institutions, and (4) government supportive policies and incentives. These findings highlight that the most critical factors impeding the development of senior housing in Hong Kong are those related to the profitability of senior housing, rather than the social or cultural factors that could affect the seniors' intentions to move. This adds further empirical support to the previous sociological work on seniors' living arrangements, which shows that even in Asian countries with a long history of the traditional culture of multigenerational living, seniors' living arrangements, including whether or not they live with adult children, are mainly determined by financial constraints such as a lack of pensions, savings, or financial support from their adult children, rather than cultural factors [105,130]. This finding is also consistent with a recent study by Lam and Yan [115], which found that traditional Chinese family-oriented culture was not the main development barrier to continuing care retirement community senior housing in Shanghai. The phenomenon that the economic factors are more dominant than the political or social factors in influencing senior housing development may be more severe in modern capitalist Asian cities like Hong Kong. Therefore, if the Hong Kong government plans to encourage housing developers to enter the senior housing market, policy interventions should primarily target the critical factors related to the profitability of senior housing. For example, they could provide land premium concessions or waivers for qualified senior housing properties, or encourage foreign healthcare REITs to invest in Hong Kong's senior housing market. In addition to improving the senior housing supply responsiveness, it is also essential to focus on financial support on the demand side, specifically the improvement of the elderly's senior housing affordability [131]. After the COVID-19 pandemic especially, the existing economic and social disparities in the city have been exacerbated, further preventing low-income seniors from accessing affordable housing options [132,133]. In this case, it is suggested to provide poor senior citizens with housing assistance, such as housing allowances or vouchers for renting senior housing units.

Another interesting finding is that the official regulations and guidelines for the design and operation of senior housing properties was the least critical external factor in Hong Kong, although it has been implemented in some US cities such as Westminster [65] and Pleasanton [63]. A possible explanation is that the US has developed a relatively mature senior housing market, with the active participation of numerous private and not-for-profit housing developers and operators [134]. They believe that the senior housing sector is an attractive investment opportunity that will benefit from the anticipated surge of the aging population [134]. Therefore, to safeguard senior housing development, it is necessary to guide and regulate the investment, planning, and design of senior housing initiatives with official standards and guidelines. In contrast, Hong Kong's senior housing market is still under development, and only the public sector and the largest not-for-profit housing organization have provided senior housing units for local senior citizens. Motivating housing developers to enter the senior housing market was perceived to be the first and

foremost priority within the context of Hong Kong. Official standards and guidelines could be more critical after the participation of other housing developers. This finding suggests that it may be necessary to tailor the external factors to different countries based on their specific contexts.

The present study contributes unique theoretical value to the existing research on senior housing. Inspired by the settlement health model, to the best of our knowledge, the present study is the first to explore the external environmental factors that influence the development of senior housing. The political, economic, and social perspectives of this factor exploration provide a theoretical lens for better disentangling how the different domains of the external factors impact the development of senior housing. Previous studies have focused on discussing the factors related to senior housing at the immediate environment level (i.e., the housing and its close surroundings), rather than at the external environment level. Further research is encouraged to explore the external factors that impact other industry sectors, as this is not limited to the senior housing sector.

The study has rich practical implications for improving senior housing policies in Hong Kong. We found that government supportive policies and incentives are essential in stimulating housing providers to invest in senior housing properties. As such, policy-makers who aim to promote the development of senior housing in their local communities should pay attention to the factors that are most attractive to housing developers. For instance, in Hong Kong, land premium concessions or waivers could be the most attractive policy incentives for local housing developers. However, government subsidies for senior housing projects should only serve as short-term promotion strategies. To maintain the financial sustainability of senior housing projects, government policies should focus on the capital and labor market, which are crucial to the long-term development of the senior housing industry. For example, fostering the development of healthcare REITs could serve as an essential external capital source for funding the long-term operation of senior housing properties.

The implications of this study are not limited to Hong Kong and can also be expanded to other countries or regions that are facing population aging and planning to promote the development of senior housing. The study drew upon nine factors in the political, economic, and social domains, based on global empirical evidence from the literature. These factors are not only applicable to Hong Kong but also to other countries or regions, including the US, Japan, mainland China, and Singapore. The relative importance of these factors, as rated by Hong Kong experts, can serve as good references for other densely populated Asian aging cities, such as Singapore, Beijing, and Shanghai. For example, high land costs may also be a significant factor that impedes the development of senior housing in these cities with limited land supply. However, the rankings of these factors should not be generalized to other countries or regions without great caution. The relative importance of each factor is likely to vary across the senior housing markets in other countries or regions, depending on factors such as the senior housing policies provided, the senior housing services' penetration rates, the REITs' development conditions, and other local contextual variables. By the same token, it would be interesting to compare the ranking results against those of parallel research in other countries or regions with different endowments concerning the development of senior housing for their local communities.

The present study has some limitations that should be acknowledged. First, the weights and rankings of the critical factors could be sensitive to the perceptions and expertise of the local experts. A limited number of local experts were interviewed in the present study, which is subject to the current unmaturing senior housing market in Hong Kong. Despite the limited number of experts, the current study's research method is still valid and can be applied in different local contexts. Future studies are encouraged to interview more local experts in their cities or regions. The current research can be extended to investigate the similarities and differences among the opinions of the local experts from different domains (e.g., academics, practitioners, and government officials), given that the experts from different domains may have disparate opinions on the relative importance

of each factor. Second, due to time and funding constraints, the present study utilized a simple AHP method to collect the local experts' opinions in one round. This method is more cost-effective, flexible, and time-saving than a Delphi-based AHP method, and it is more easily understood and accepted by local experts with busy schedules. However, it is acknowledged that a Delphi-based AHP method could be a more rigorous, transparent, and credible method for aggregating the opinions of experts with diverse backgrounds, because it involves multiple rounds of factor rating and takes into account the whole expert panel's responses and feedback, until reaching a consensus [135–137]. Therefore, if time and resources permit, a Delphi-based AHP method is highly recommended for future studies to quantify the relative importance of the external factors, which can help to increase the reliability and validity of the findings. Third, the effects of technological factors have not been considered in the present study. Amid the rapid development of smart cities, various new technologies have been adopted in all sectors [138], including in the senior housing industry [139]. The COVID-19 pandemic accelerated the adoption of these technologies in the senior housing sector, for example, the use of robot visits that allows families to connect with seniors in these communities, and the use of telehealth that allows for virtual physician appointments and telemedical diagnoses [140]. However, the adoption of new technologies may also exacerbate the unaffordability of housing and elderly care for low-income seniors [141]. It is worthwhile to further explore the “double-edged sword” effects of new technologies on the development of senior housing. Finally, considering that the face-to-face interviews were conducted prior to the COVID-19 pandemic, the impacts of the COVID-19 pandemic on senior housing development have not been fully considered in the present study. In addition to the penetration of new technologies, empirical studies have also found that the COVID-19 pandemic had a significant influence on housing markets in terms of vacancy rate [142], housing price [143], housing affordability [144], and housing demand [145]. Therefore, a future study in the post-COVID environment is needed to explore how political, economic, social, and technological factors could influence senior housing development in the post-pandemic era.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Calculation Steps of the Analytical Hierarchy Process Method

The nine reviewed factors are arranged hierarchically, as shown in Figure A1. The experts were asked to make four sets of pairwise comparisons, among which was one set for comparing categories and three sets for comparing the factors under each category. Each set of comparisons contained three pairs of category-to-category or factor-to-factor comparisons. For a given pair of categories or factors, the experts needed to deliberate which one was more important in influencing the development of senior housing in Hong Kong.

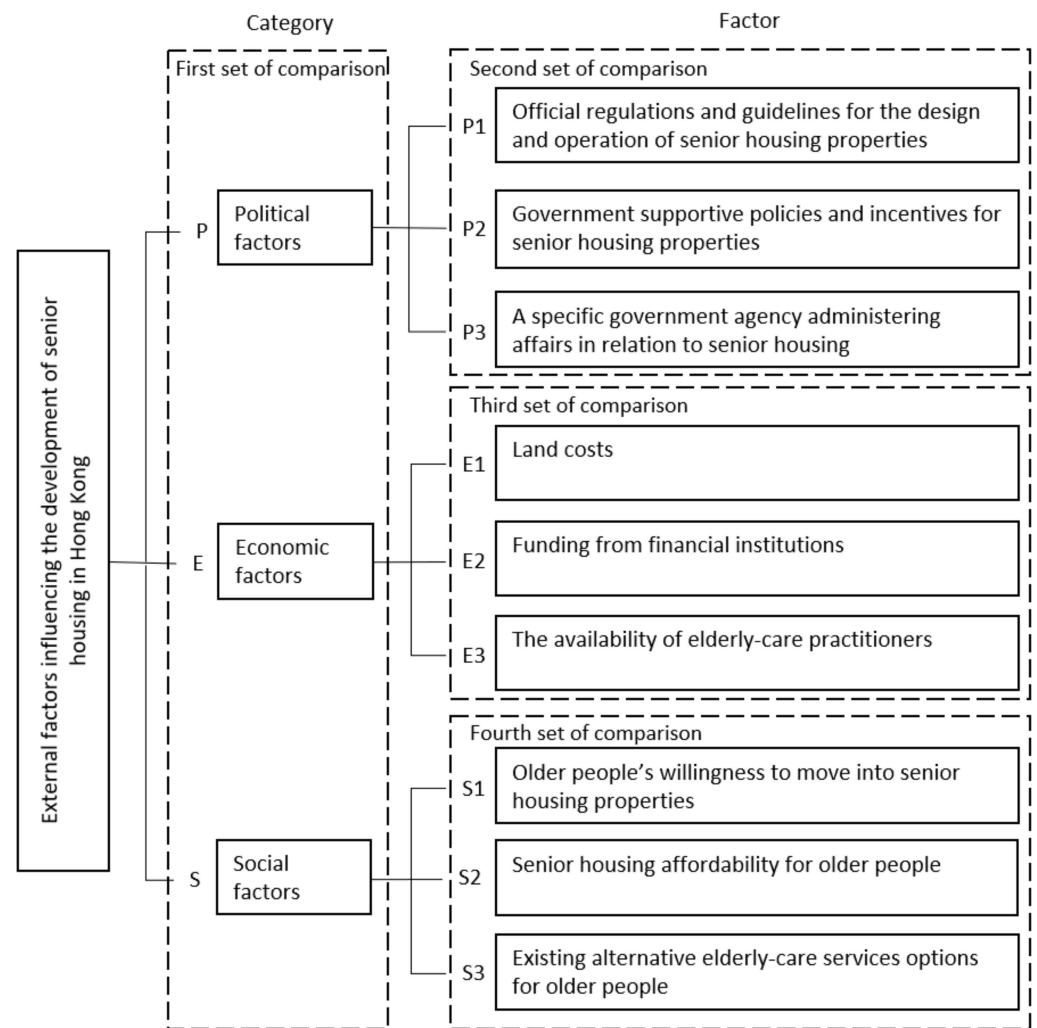


Figure A1. The hierarchical model of the reviewed factors.

The intensity of the influence is measured by the ‘AHP 1–9 scale’ that is capable of converting the qualitative judgements of the experts into quantitative evaluations. The rating scales for each set of the pairwise comparisons can be represented in a 3×3 comparison matrix, as shown in Table A1. The element $(i, j)_1$ is the judgment value in terms of the relative importance of comparing attribute i with attribute j , according to Expert 1. For example, the value of the element $(1, 2)_1$ is assigned as 3, which means that Expert 1 perceived that factor E1 is slightly more important than factor E2. Conversely, element $(i, j)_1$ is the reciprocal value of the element $(j, i)_1$. Likewise, such a comparison matrix can be constructed for other sets of comparison.

Table A1. Comparison matrix for economic factors from Expert 1.

	E1	E2	E3
E1	1	3	5
E2	1/3	1	1
E3	1/5	1	1

AHP 1–9 scale:
 1: Equally important
 3: Slightly more important
 5: Strongly more important
 7: Demonstrably more important
 9: Absolutely more important

The geometric mean method [146] is used to calculate the weights for the categories and factors. As shown in Figure A2, a synthesized 3×3 matrix is constructed from the nine experts' comparison matrices, whose elements are the geometric mean of the elements of the nine experts' comparison matrices. For example, the element (1, 2) is calculated as shown in Equation (A1):

$$\text{element (1, 2)} = \frac{1}{9} \left(3 + 5 + 5 + 7 + 9 + \frac{1}{5} + 5 + \frac{1}{5} + 5 \right) = 2.560 \quad (\text{A1})$$

Pairwise Comparison Matrix for Economic Factors						
E1 = Land costs						
E2 = Funding from financial institutions						
E3 = The availability of elderly-care practitioners						
						Total experts:
						9
Synthesized Comparison Matrix:						
	E1	E2	E3	Local weight	Global weight	
E1	1.000	2.560	4.946	$\begin{bmatrix} 0.632 \\ 0.229 \\ 0.139 \end{bmatrix} \times 0.517 = \begin{bmatrix} 0.327 \\ 0.118 \\ 0.072 \end{bmatrix}$	$\lambda_{max} = 3.006$ $CI = 0.003$ $RI = 0.58$ $CR = 0.005$ $CR < 0.10 \rightarrow \text{OK}$	
E2	0.391	1.000	1.526			
E3	0.202	0.655	1.000			
Sum	1.593	4.215	7.473	1.000	0.517	

Figure A2. An example of weights calculation.

The local weights of the factors under each category are then derived by normalizing the elements of each column and averaging the values of each row. For example, the local weight w_{B1} is the normalized eigenvector for the factor B1, which is calculated as shown in Equation (A2):

$$w_{B1} = \frac{1}{3} \left(\frac{1}{1.593} + \frac{2.560}{4.215} + \frac{4.946}{7.473} \right) = 0.632 \quad (\text{A2})$$

The global weights of each factor are calculated by multiplying the local weights of each factor with the weights of its governing category. For example, the global weight of factor B1 is calculated as shown in Equation (A3):

$$w_{B1} = 0.632 \times 0.517 = 0.327 \quad (\text{A3})$$

The consistency of the experts' judgment is verified by the indicator consistency ratio (CR), which should be less than 0.1, as suggested by Saaty [56]. The CR is calculated by Equation (A4):

$$CR = \frac{CI}{RI} = \left(\frac{\lambda_{max} - n}{n - 1} \right) \frac{1}{RI} \quad (\text{A4})$$

where CI is the consistency index; RI is a random index ($RI = 0.58$ for $n = 3$); λ_{max} is the largest eigenvalue of the matrix; and n is the number of factors in each set of comparisons.

From above, both the local and final weights of each factor can be determined by AHP analysis. The local weights of each factor reflect its relative importance compared with the other two factors under its governing category, e.g., which economic factors are more important in influencing the development of senior housing in Hong Kong. The final weights of each factor reflect its relative importance compared with the other eight factors

in three categories, e.g., which political, economic, and social factors are more important in influencing the development of senior housing in Hong Kong.

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